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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/034,730

12/28/2001

Tajinder Manku

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03/07/2006

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EXAMINER

PATHAK, SUDHANSHU C

ART UNIT

PAPER NUMBER

2634

DATE MAILED: 03/07/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/034,730

Applicant(s)

MANKU ET AL.

Examiner

Sudhanshu C. Pathak

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on December 14th, 2005.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-26 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-16 and 18-26 is/are rejected.
- 7) ☒ Claim(s) 17 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

1. Claims 1-2, 4-7 & 9-26 are pending in the application.
2. Claims 3 & 8 have been canceled.

Response to Arguments

3. Applicant's arguments with respect to claims 1-26 have been considered but are moot in view of the new ground(s) of rejection.
4. In regards to the Arguments to the Kobler reference, the references discloses all the limitations recited in the claims, even though Kobler may be addressing a different problem. Therefore, the applicants arguments have been considered and are not persuasive.

Claim Rejections - 35 USC § 112

5. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

6. Claims 25-26 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.
7. Claims 25-26 are hybrid claims.

Claim 25 discloses ".....computer software code in a hardware development language.....", however, the claim depends on Claim 1 which claims "A signal converter....." (an apparatus). Both method and an apparatus cannot be specified in the same claim. It is suggested that the above specified claims be written as

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multiple claims with each claim specifying either a method (software code) or an apparatus.

Claim 26 discloses "A computer data signal embodied.....", however, the claim depends on Claim 1 which claims "A signal converter....." (an apparatus). Both signal and an apparatus cannot be specified in the same claim. Furthermore, a signal is non-statutory subject matter and therefore is not patentable. A signal itself is unpatentable, but a method and apparatus to generate the desired signal is patentable.

Double Patenting

8. The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. A nonstatutory obviousness-type double patenting rejection is appropriate where the conflicting claims are not identical, but at least one examined application claim is not patentably distinct from the reference claim(s) because the examined application claim is either anticipated by, or would have been obvious over, the reference claim(s). See, e.g., *In re Berg*, 140 F.3d 1428, 46 USPQ2d 1226 (Fed. Cir. 1998); *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) or 1.321(d) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent either is shown to be commonly owned with this application, or claims an invention made as a result of activities undertaken within the scope of a joint research agreement.

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

9. Claims 1, 22-23 are provisionally rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claim 1 of

copending Application No. 10/070, 013 (now Patent No. 7016662 to be issued on 3/21/2006).

This is a provisional obviousness-type double patenting rejection.

Regarding to Claim 1, the copending application mentioned above discloses a signal converter for emulating the modulation or demodulation of an input signal $x(t)$, with a local oscillator signal having frequency f said signal converter (Claim 1 of copending application, lines 1-3) comprising: a synthesizer for generating wideband mixing signals φ_1 and φ_2 which vary irregularly over time (Claim 1 of copending application, lines 4-5) where: $\varphi_1 * \varphi_2$ has significant power at the frequency of said local oscillator signal being emulated (Claim 1 of copending application, lines 6-7); neither φ_1 nor φ_2 has significant power at the frequency f of said local oscillator signal being emulated (Claim 1 of copending application, lines 8-9); and said mixing signals φ_1 and φ_2 are designed to emulate said local oscillator signal having frequency f (Claim 1 of copending application, lines 10-11); a first mixer coupled to said synthesizer for mixing said input signal with said mixing signal φ_1 , to generate an output signal $x(t) * \varphi_1$ (Claim 1 of copending application, lines 12-13); and a second mixer coupled to said synthesizer and to the output of said first mixer for mixing said signal $x(t) * \varphi_1$ with said mixing signal φ_2 to generate an output signal $x(t) * \varphi_1 * \varphi_2$, said output signal $x(t) * \varphi_1 * \varphi_2$ emulating the modulation of said input signal $x(t)$ with said local oscillator signal having frequency f (Claim 1 of copending application, lines 14-17). The Claim 1 of the copending application discloses an up-converter instead of a converter and

does not explicitly the synthesizer being operable to shape the frequency spectrum of the mixing signals ϕ_1 and ϕ_2 . However, it would have been obvious to one of ordinary skill in the art at the time of the invention that an up-converter is a converter. Furthermore, the mixing signals ϕ_1 and ϕ_2 even though are wideband signals they are band limited since neither has significant power at frequency f , therefore, it would be obvious to one of ordinary skill in the art at the time of the invention that this would require shaping (filtering) of the mixing signals.

Claim Rejections - 35 USC § 103

10. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

11. Claim 1, 6-7 & 21-23 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kolber (WO 96/01006) in view of Itoh et al. (5,787,126).

Regarding to Claim 1, 6-7 & 21-23, Kolber discloses a signal converter for modulating or demodulating an input signal $x(t)$ (Fig. 1, elements 11, 15 & Abstract, lines 1-7 & Specification, Page 1, lines 7-22 & Specification, Page 2, lines 18-28 & Fig. 2 & Specification, Page 4, lines 5-9 & Claims 1, 11) comprising: a synthesizer for generating wideband mixing signals ϕ_1 and ϕ_2 (Fig. 2, element 24 & Specification, Page 3, lines 11-25 & Specification, Page 5, lines 18-24) which vary irregularly over time, where $\phi_1 * \phi_2$ has significant power at the frequency of a local

oscillator signal being emulated (Fig. 1, element "L.O" & Fig. 2 & Specification, Page 2, lines 18-28 & Specification, Page 3, lines 5-10 & Specification, Page 4, lines 16-22 & Abstract, lines 1-7), a first mixer coupled to said synthesizer for mixing said input signal with said mixing signal ϕ_1 , to generate an output signal $x(t) * \phi_1$ (Fig. 2, element 21 & Abstract, lines 1-7 & Specification, Page 3, lines 11-18 & Specification, Page 4, lines 10-15 & Fig. 3A-3C & Claims 1, 11); and a second mixer coupled to said synthesizer and to the output of said first mixer for mixing said signal $x(t) * \phi_1$ with said mixing signal ϕ_2 to generate an output signal $x(t) * \phi_1 * \phi_2$ (Fig. 2, element 26 & Abstract, lines 1-7 & Specification, Page 3, lines 18-25 & Specification, Page 4, lines 27-31 & Specification, Page 5, lines 1-2 & Fig. 3D-3F & Claims 1, 11). Kolber also discloses the wideband signals generated by the synthesizer to randomly generate the mixing signals (Specification, Page 4, lines 16-22 & Specification, Page 5, lines 18-24 & Fig. 2, element 24). Kolber also discloses the synthesizer uses a single time base to generate both the mixing signals (Fig. 2, elements 22, 24, 27, 28 & Specification, Page 5, lines 3-10). Kolber also discloses the local oscillator coupled to the synthesizer for providing a signal having a frequency that is an integral multiple of the desired mixing frequency (Specification, Page 1, lines 18-28 & Specification, Page 4, lines 11-15, 27-31 & Specification, Page 5, lines 1-5). Kolber also discloses the synthesizer generating mixing signals wherein the first wideband mixing signal ϕ_1 being a much higher frequency than the second wideband mixing signal ϕ_2 (Specification, Page 4, lines 10-15, 27-31 & Specification, Page 5, lines 1-5 & Fig. 2, elements 22, 27). Kolber further discloses the wideband

signals generated by the synthesizer φ_1 & φ_2 where neither of the wideband signals have significant power at the frequency of the local oscillator signal being emulated and further where $\varphi_1 * \varphi_2$ and $\varphi_1 * \varphi_1 * \varphi_2$ does not have significant power within the bandwidth of the input signal at baseband thereby reducing the effects of local oscillator leakage (Fig. 2, elements 22, 27 & Specification, Page 4, lines 10-31 & Specification, Page 5, lines 1-10 & Fig. 3A-3F). However, Kolber does not disclose the synthesizer to further comprise shaping the spectrum of the mixing signals.

Itoh discloses a filter to shape the spectrum of the local oscillator signal (Fig. 28, element 51 & Fig. 29 & Column 13, lines 65-67 & Column 14, lines 1-10). Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention that Itoh discloses a filter to shape the spectrum of the local oscillator signal and this can be implemented in the signal converter as described in Kolber so as to avoid interference signals from leaking into the receiving chain, thus satisfying the limitation of the claim.

12. Claims 2, 4-5 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kolber (WO 96/01006) in view of Itoh et al. (5,787,126) in further view of Marz (5,390,346).

Regarding to Claim 2, Kolber in view of Itoh discloses a signal converter for modulating or demodulating an input signal comprising a synthesizer for generating wideband mixing signals which vary irregularly over time and the product of which has significant power at the frequency of the local oscillator being emulated; a first mixer for mixing the input signal with a first wideband signal; and a second mixer for

mixing the output of the first mixer with the second wideband signal, to generate an output signal which is a product of the input signal and the two wideband signal, in the time domain as described above. Kolber further discloses the local oscillator signal to be a pseudo random spreading function which could be of various types including frequency hopping and chirp type spreading functions (Specification, Page 4, lines 16-22). Kolber also discloses multiple spreading function generators can be implemented for the multiple local oscillator signals for the demodulation or modulation of received signals (Specification, Page 5, lines 18-24). However, Kolber in view of Itoh does not explicitly specify implementing the local oscillator (wideband) signals to have different patterns.

Marz discloses a double frequency converter comprising a first and second local oscillator synthesizer (Abstract, lines 1-6 & Fig. 1). Marz further discloses the programmable synthesizer generates the LO signal from the received reference (pattern) and the received control signal (desired frequency) for each of local oscillators (Column 4, lines 60-68 & Column 5, lines 11-17). Marz also discloses each of the reference signals for each of the local oscillators can be generated from a single source or separate remote independent sources. Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention that Marz teaches implementing the local oscillators with different reference signals (pattern) and this can be implemented in the signal converter as described in Kolber in view of Itoh so as to demodulate and despread the incoming signals simultaneously, thus satisfying the limitations of the claim. Furthermore, there is no criticality in selecting

the first and second wideband signals to be of different patterns since the downconverting and/or upconverting is performed in the frequency domain, this is a matter of design choice for the application of the receiver to be in a direct sequence spread spectrum system.

13. Claims 9-16 & 18-19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kolber (WO 96/01006) in view of Itoh et al. (5,787,126) in further view of Applicant Admitted Prior Art (AAPA).

Regarding to Claims 9–16 & 18-19, Kolber in view of Itoh discloses a signal converter for modulating or demodulating an input signal comprising a synthesizer for generating wideband mixing signals which vary irregularly over time and the product of which has significant power at the frequency of the local oscillator being emulated wherein the synthesizer further comprises a filter to shape the spectrum of the mixing signals; a first mixer for mixing the input signal with a first wideband signal; and a second mixer for mixing the output of the first mixer with the second wideband signal, to generate an output signal which is a product of the input signal and the two wideband signal, in the time domain wherein the wideband mixing signals are generated pseudo-randomly as described above. Kolber further discloses the signal converter further comprising a filter for removing unwanted signal components from the output of the first mixer, $x(t) * \phi_1$ (Fig. 2, element 23). However, Kolber in view of Itoh does not disclose the synthesizer to further comprise a delta sigma block for generating the mixing signals.

The Applicant Admitted Prior Art (AAPA) discloses a delta sigma modulator for the design of digital to analog converters and analog to digital converters (Specification, Page 13, lines 32-34 & Specification, Page 14, lines 5-7). The AAPA also discloses a delta sigma modulator to produce a pseudo-random bit stream (Specification, Page 16, lines 3-5). The AAPA also discloses the clock of the delta sigma determines the oversampling rate of the delta sigma block (Specification, Page 16, lines 4-5). Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention that the AAPA teaches implementing a delta sigma modulator to generate a pseudo random bit stream and this can be implemented in the synthesizer as described in Kolber in view of Itoh so as to generate wideband mixing signals, thus satisfying the limitations of the claims. Furthermore, there is no criticality in varying the oversampling rate of the delta sigma modulator and the mixing signals over time, this is a matter of design choice depending on the quantization noise desired and the level of the input signal of the application so as to provide an optimum delta sigma modulator. Furthermore, there is no criticality in selecting the wideband mixing signals to be periodic; this is a matter of design choice depending on the application. Furthermore, there is no criticality in selecting the order of a delta-sigma block or select a 1-bit delta-sigma block it is a matter of design choice depending on the accuracy needed for the modulator.

14. Claims 20, 24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kolber (WO 96/01006) in view of Itoh et al. (5,787,126) in further view of Manku et al. (6,148,184).

Regarding to Claims 20, 24, Kolber in view of Itoh discloses a signal converter for modulating or demodulating an input signal comprising a synthesizer for generating wideband mixing signals which vary irregularly over time and the product of which has significant power at the frequency of the local oscillator being emulated; a first mixer for mixing the input signal with a first wideband signal; and a second mixer for mixing the output of the first mixer with the second wideband signal, to generate an output signal which is a product of the input signal and the two wideband signal, in the time domain wherein the wideband mixing signals are generated pseudo-randomly as described above. However, Kolber does not disclose the either one of the mixing signals to mix 90 degrees out of phase thereby generating an in-phase and quadrature components of the input signal and further the converter is implemented as an integrated circuit.

Manku discloses implementing the down converter implemented as an integrated circuit (Column 3, lines 17-24). Manku also discloses mixing signals to mix 90 degrees out of phase thereby generating an in-phase and quadrature components of the input signal (Fig. 1, elements 10-17 & Claim 1 (Column 4, lines 1-9)). Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention that Manku teaches mixing the input signal with an local oscillator signal 90 degrees out of phase so as to generate an in-phase component and a quadrature

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component of the input signal and further implementing the converter as an integrated circuit and this can be implemented as the converter as described in Kolber in view of Itoh so as to provide an highly integrated transceiver requiring fewer and less complex components, thus satisfying the limitations of the claims.

Allowable Subject Matter

15. Claim 17 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Conclusion

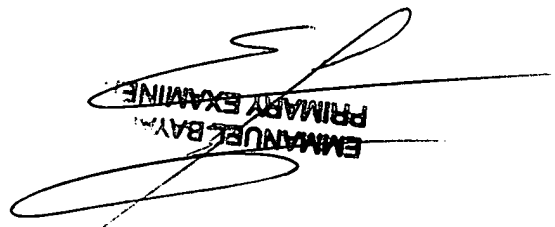
16. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

17. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Sudhanshu C. Pathak whose telephone number is (571)-272-3038. The examiner can normally be reached on M-F: 9am-6pm.

- If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Chieh M. Fan can be reached on (571)-272-3042
- The fax phone number for the organization where this application or proceeding is assigned is (571)-273-8300.
- Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Sudhanshu C. Pathak



EMMANUEL BAY
PRIMARY EXAMINER